Intangible Assets and Determinants of Firm Growth in China

Abstract

This paper reports on fieldwork within Chinese small firms, aimed at acquiring data to measure the impact of intangible assets on firm growth. We extend a size- and age-based model to define growth as a function of size, age, entrepreneurship and intangible assets. We use statistical analysis to create measures of entrepreneurship and intangible assets from these data. Intangibles are classified into six categories: human capital; enterprise culture, intellectual property; technology; reputation; and network. Finally, we estimate models of small firm employment growth using our new measures. For our sample, we find that entrepreneurial attributes have little significant impact on small firm growth; whereas intangible asset attributes have a positive and significant impact on growth, with networking and technological knowledge being of prime importance.

1. Introduction

This paper sets out, first, to measure and calibrate entrepreneurship and intangible assets; and, second, to discover their impact on the growth of Chinese private firms at the microeconomic level (cf. Jarrar & Smith, 2014; Rhodes et al, 2011; Schiff, 2013). We suggest that superior firm performance depends on the entrepreneur's orientation and the resources they own and control (cf. Bisbe & Malgueño, 2015; Chenhall et al, 2011). Our approach corresponds to the entrepreneurship and resource-based views found in mainstream western literature on the growth of the firm. Our method is empirical, applying statistical and econometric analysis to new fieldwork-based data, gathered from 83 private firms by face-to-face interviews using an administered questionnaire. This fieldwork took place in the Guangdong Province of PR China (hereafter simply 'China') during the three month period September-December 2004, with follow-up telephone interviews taking place in February 2006. Fieldwork methods and new instrumentation were designed to capture the intent and content of our complex concepts of entrepreneurship and intangible assets.

2. Theoretical Background

It is apparent that a firm cannot grow without the willingness of entrepreneurs (or owner-managers), actually to create new commercial organizations that will satisfy their aspirations, and serve their other purposes. Whilst the nature of the entrepreneur is still far from agreed[1], the development of thought on entrepreneurship has involved the accumulation of a rich, yet diverse and fragmented body of knowledge (e.g. Baumol, 1996; Blanchflower & Oswald, 1998; Davidsson, 2015; Shane & Venkataraman, 2000; Miller and Toulouse, 1988; Bird, 1993; Begley, 1995). From our point of view, a comprehensive view of entrepreneurship might be that the entrepreneur is a manager who drives change, pursues opportunity and creates new value in an innovative way. This willingness to engage in such entrepreneurial behaviour is thereby defined as entrepreneurial orientation (EO) (cf. Bisbe and Malgueño, 2015; Jarrar & Smith, 2014), which is at the core of entrepreneurship (Lumpkin and Dess, 1996; Brown, 1996; Wiklund, 1998). Nonetheless, the link between this core conception of entrepreneurship (i.e. EO) and its implications for small firm growth/performance are not straightforward, to judge by prior research in the West. Some would claim a strong, positive influence between the two (Zahra, 1991; Zahra and Covin, 1995; Wiklund, 1998), or at least a muted one (Rauch, et al. 2009); whereas others would claim no significant positive impact of EO on growth at all, or even a negative impact (Hart, 1992; Smart and Conant, 1994; Auger, et al., 2003). Thus, one of the several purposes of this paper is to conceptualize EO, within the setting of the Chinese economy, and then to examine its relationship with the growth of Chinese firms (cf. Schiff, 2013).

1 i.e. Say's 'coordinator', Knight's 'uncertainty bearer', Kirzner's 'arbitrager' and Schumpeter's 'innovator', for example.

The other prerequisite for success is 'resource', as in the resource-based view of the firm (e.g. Wernerfelt, 1984; Barney, 1991; Peteraf, 1993; Teece et al., 1997). If entrepreneurship is a process which 'represents the alert becoming aware of what has been overlooked' (Kirzner, 1977), then the resource-based view of the firm reminds one of what has been possessed, within the reach of entrepreneurial action, and of what outcomes, in the real world that the firm inhabits, can be attributed to its actions. The seminal work of Penrose (1959) particularly referred to resources as 'productive services' (i.e. tangibles) and 'managerial services' (i.e. intangibles).[2] Although the continuous availability of the former and the supply, release and growth of the latter were both perceived to influence business expansion directly, lack of appropriate managerial services was taken as the principal constraint on growth. The renowned 'Penrose Effect' was later modelled by Slater (1980) who formalised mathematically the positive relationship between 'managerial services' and firm growth.[3] In the later extensive development of research in this field, intangible resources were also characterized as being 'core competences' by Hamel and Prahalad (1990), 'skills' by Hall (1992), or 'capabilities' by Nelson and Winter (1982). Regardless of these disparate labels, it is a widely held view that a firm's success may largely depend on the intangible assets (IA) it owns and controls (Bisbe & Malgueño, 2015). Extending this line of though, see Basu & Waymire (2008) for an interesting discussion of the increasing importance of intangibles, from both historical and international perspectives.

2 Other categorizations of resources are also suggested in the literature. While Hofer and Schendel (1978) suggested six types, viz. financial resources, technological resources, physical resources, human resources, reputation, and organizational resources, Collis (1994) and Galbreath (2005) advocated a simple dichotomy between tangible and intangible resources. See also Skinner (2008) for a useful conspectus of policy recommendations on accounting for intangibles.

3 Slater's model (1980) also argued that high growth-oriented firms may initially start with a lower output level, which equally amounts to saying that smaller sized firms may grow faster, a departure from Gibrat's law.

In China, after more than two decades of rapid economic development that greatly consolidated the infrastructure of the nation, it became a marked concern, amongst policy makers for the Chinese economy, that the nation should realize its 'intangibles'. Though they are rare, heterogeneous and difficult to create, imitate or substitute (Wiklund, 1998; Lockett & Thompson, 2004), it was felt that their acquisition should be given priority. See Wan et al (2015) for example, for a discussion of the increasing importance of intangible compared to tangible resources in Chinese wood-product companies. Following this lead, another important aim of this paper is to measure empirically the intangible assets (IA) that are owned by Chinese private firms, as well as to examine their role in driving the expansion process which is helping to cause the transition of the Chinese economy.

The first Intangible Asset (IA) we discuss is **human capital** (Huang et al., 2013; Uliana et al., 2005), which we define as 'the skills, general or specific, acquired by an individual in the course of training and work experience' Law (2009). This kind of IA may be expressed in operational form as: (a) educational, technical, or vocational certificates held by employees; (b) compensation levels for performance level, as compared to the average industry level; (c) work records; and (d) period of job incumbency (Grant, 1997). Whilst we do use the first two items, which are measured in our study as the extent of higher education among employees (Diploma) and the compensation level compared with the industry average (Salary), evidence on the latter two are not generally available from Chinese owner-managers, so we cannot measure them. Fortunately we do have other measures. For example, the number of enterprise stimulation schemes (Nstimula) is reported, since policy makers judge that the greater the stimulation, the lesser the work disputes and lower the job turnover. Furthermore, additional variables are suggested by the work of Colombo and Grilli

(2005) which has particularly focused on the educational background and prior working experience of founders of new firms. Therefore the implementation of training programmes (Training), and the frequency of top management training (Toptrain), were recorded by us as measuring further dimensions of human capital.

The second proposed component of IA is enterprise **culture** (Agbejule, 2011; Busco & Scapens, 2011), where culture is defined as 'the values, beliefs, norms, and traditions within an organization that influence the behaviour of its members'.[4] It can be disaggregated into communication, openness to change, job design, job pressure, organizational integration, leadership, vision, and so forth (Eggers et al., 1996). In the same vein, the number of communication channels (Communi) is operationalized into enterprise culture as a tool for assessing the smoothness of two-directional communication. The flexibility of changing firm codes and regulations (Codes) reflects the basic attitude towards the change of management. Moreover, the frequency of company social activities (Social) is judged to help release job pressures and to reinforce organizational integration. The influence of entrepreneurs on their enterprise culture (Leader) and company slogan (Slogan), respectively, aim to reflect the leadership and firm vision. Finally, the standard of working conditions (Workcon) is also thought to be a part of enterprise culture, especially when this standard certainly benefits the employees today, rather than pandering to the dubious 'political inspections' of the past[5].

Intellectual property (IP) is usually defined by reference to copyrights, patents and trademarks (cf. Dumitrescu, 2012; Hall, 1992; Kianto et al, 2013). Although the majority of Chinese firms in the sample do not hold any type of copyrights or patents,

4 Differences in factors like level of formality, loyalty, respect for long service, and so on, often vary significantly across firms. This gives each one a distinctive ethos, upon which is predicated the conduct of new recruits, Law (2009).

5 Good working conditions were usually important for winning so-called 'hygiene competitions' which were organized by local government in China in the 1980s and early 1990s, notably before the large scale privatisations of 1997.

it is informative to ask if they do (Patent) and (if so) how many they hold (Npatent). Galbreath (2005), reflecting modern trends, has, by his work, suggested two more variables to add to the IP pool, namely trade secrecy in two forms, as either 'held-in-secrecy' techniques, or as designs. Considering the acutely sensitive nature of these forms of IP, we were highly doubtful whether Chinese entrepreneurs, who are legendary for their strict business discretion, would tell us anything at all about them, even if they existed. However, another viable IP variable is the establishment of an R&D branch or technical centre (RDbranch), wherein such trade secrecy, as well as regular forms of proprietary IP, may be generated (cf. De Waegenaere et al., 2012).

Whilst intellectual property (IP) is a relatively straightforward concept to put into operation, this is not true of technological knowledge or, more simply, but more ambiguously, **technology**. It is troublesome, because, as an area of enquiry, it substantially overlaps with other aspects of the EO perspective and the resource-based view of the firm. In Grant's (1997) illustration, technology is embodied in (a) the number of patents, (b) the ratio of R&D staff to the total employment, and (c) the revenues generated by patents. The first two resemble the attribute of innovativeness in EO and Npatent in terms of intellectual property, whereas the third is harder to measure. Given such difficulties, here we adopt the methodology of Spender (1996), as later developed by Neck et al. (2000), and utilize the following measures of technology: conscious technological know-how (self-rated technology level, Tech); and objectified technology (the implementation of international quality standard, ISO; the types of computer software used, Software) (cf. Dumistrescu, 2012). The higher the value of any of the variables above, the higher is the level of technical know-how estimated.

Reputation is a critical intangible asset (cf. Guilding & Pike, 1990; Yu Wong, 1998). While Hall (1992) simplified organizational reputation as being corporate image and brand name (cf. Davison, 2009), Grant (1997) operationalized the idea by suggesting measures such as: the price difference with competing products; the repeated purchasing rate of existing customers; company financial performance over time; and product quality perception. In an SME context, the latter approach seems more appropriate, and the major indicator of reputation in this study is originally designed as the perception of product quality, in relation to substitutes (better, equal or lower). Yet the data revealed that a large percent of respondents did not report this variable, due to the varying individual interpretation of the scope of substitutes. Hence, the missing data force an alternative approach that measures the promotion of firm reputation by advertisement (Ads), the media types of advertisement (Adsmedia), and the launch of a company website (Website). Although reputation is not now gauged directly, it is hoped that these efforts to measure 'face' may be also revealing.

Last but not least, **network** plays a pivotal role among all components of IA (cf. Moeller, 2010; Nielsen & Montemari, 2012). 'Guan xi', a proxy for personal network in China, is deeply rooted in its ancient culture (Lu, 2012). In the empirical literature, this extraordinary intangible asset is variously labelled as 'broad network' (Butler and Brown, 1994), 'connectivity' (Rickne, 2001), 'relation mix' (Lechner et al., 2003), or 'inter-firm relations' (Havnes and Senneseth, 2001). Ding et al (2015), for example, discuss the extent to which political connections have an impact upon executive compensation in China. See Yu Wong et al (1998) for a deeper understanding of the peculiarities of Chinese culture and the problems this poses for business outsiders. Concerned as it is with such complexity of networks, our work recognises a variety of relationships based on the available dataset collected in the fieldwork. For instance,

the sources of initial financing (Knet) reflect a firm's external financial relationship, whereas the sources of advice (Advinet) for founding the firm show the firm's 'relation mix' at business inception. Further, the number of technological partners (Technet) and the number of suppliers (Supnet) describe specific network relations in terms of technology and the supply chain, respectively. It is hypothesized that the value-adding process of IA can thereby be facilitated by having a broader network.

3. Methodology

This section develops the empirical underpinning of our paper. First, the fieldwork methods, instrumentation and sampling are explained. Then we report upon our preliminary statistical analysis: binary correlation analysis is undertaken of the intangible attributes, to discard marginal attributes, and to achieve a high reliability of factors. We also report reliability tests which were conducted to identify those attributes that can form an internally consistent scale (and to remove those that do not). All statistical computations were carried out using SPSS 12.0.

Fieldwork and Instrumentation

The evidence used in this article was gathered by structured interviews, which involved face-to-face interviews with entrepreneurs of a group of sampled firms trading in the Guangdong Province of China. Gatekeepers to the field were obtained by personal referrals, as Chinese entrepreneurs are notoriously secretive about their business operations, and trusted sources are essential to getting reliable evidence. These referrals were provided by a large student body (nearly 180 undergraduate students majoring in international business or finance, with English) and teaching staff (nearly 80), all of whom were from strong family business backgrounds. All

were affiliates of the School of English for International Business (SEIB) at Guangdong University of Foreign Studies (GDUFS). This access was facilitated by one of the authors lecturing in entrepreneurship at GDUFS over the period 2004-2005. The selection criteria were that a sampled firm should be: (a) privately owned, (b) financially independent (not a subsidiary), and (c) located in the territory of Guangdong Province. From an initial sampling frame of 110 firms, twelve firms were dropped for failing criterion (c), and another nine firms were dropped because of personal circumstances of the entrepreneurs (e.g. illness). The response rate was 90.8%. This high response rate demonstrates the benefit of 'guan xi'.

Ideally one would select firms randomly from a sampling frame (e.g. yellow pages), to create a probabilistic sample. However, most owner-managers of Chinese firms simply ignore postal questionnaires if they are not officially backed; and if they are, the data can often be unreliable. Given Chinese mores, it is unrealistic to expect any chief executive officer (CEO), or deputy, to talk for at least 90 minutes (our typical interview time) face-to-face or on the telephone, on a 'cold call' basis. You have to be an insider to get this sort of privilege. As 'guan xi', the trusted network connection, is essential to fieldwork research of our kind, standard statistical sampling had to be ruled out. As Scott and Marshall (2005) have argued, 'studies of (for example) members of a religious sect rarely require probability sampling: a selection of the membership …is usually considered to be sufficient.' Whilst it is certainly improper to regard a Chinese business community as a religious group, it can appear equally mysterious and unapproachable, if the fieldworker has no trusted connection with the community. Fortunately, our sample characteristics provide reasonable assurance about the usefulness of our evidence for testing theories of entrepreneurship

– and specifically about the determinants (e.g. EO and IA) of small firm growth. This point is illustrated by size distribution evidence below.

The National Bureau of Statistics (NBS) of China convention for the relevant time period is that an enterprise is a small firm if employment is below 600 or sales are below 30 million Chinese Yuan (equal to 1.93 million British Pounds).[6] Medium sized firms have sales between 30 and 300 million Chinese Yuan, or employ less than 3,000 full-time workers. Beyond this scale, firms are considered to be large. The size distribution by employment is given in Table 1.

[Insert Table 1 here]

In Table 1, size by employment in the sample is highly correlated with the Guangdong population of firms. Using a non-parametric test Kendall's τ_b applied to the cross tabulation of Table 1, we get a test statistic that is approximately unity (to four significant figures) which has a very small (almost zero) probability value. We conclude that we have a sample which is an excellent representation of the size distribution of the population of small firms.

Our survey instrument, an administered questionnaire, was designed to provide: (a) key statistics on private firms in the Guangdong Province; (b) statistics to calibrate the growth of these firms; and (c) data for exploring the causality between multiple attributes (specifically EO and IA) and firm growth. The administered questionnaire had eight sections:

1. Background

6 The exchange rate for this conversion was set at the average level in January, 2005.

2. Firm operations
3. Human resource management
4. Finance
5. Technology and innovation
6. Enterprise culture
7. Competition
8. Macro environment

The administered questionnaire contained 106 numbered questions in qualitative and quantitative forms. Whilst the former type enables respondents to provide the qualitative information in his/her particular situation, the latter supplies the numerical data in a relatively more objective way. Our aim was to maximize the quality and quantity of information flow, by gathering evidence of both a qualitative and a quantitative nature (Tashakkori and Teddlie, 1998). For a discussion of the issues of undertaking qualitative fieldwork in a developing country see, for example, Hossain et al (2015). See also Shafer & Simmons (2011) for a field survey on the nature of organizational ethical culture in China. Our questions were organized in a variety of formats, such as blank-filling, multiple-choice (permitting either a single answer or multiple answers) and true/false questions. We regarded previously successful question designs as our point of departure. In terms of the empirical literature, our yardsticks for questionnaire design include e.g. Converse and Presser (1986), Reid (1988, 1993), and Fowler (1995). The answers to questions generated a wide variety of variables. The subset of these used in this paper are defined precisely in the Appendix to this paper.

As we were targeting Chinese privately owned firms, whose owner-managers had diverse educational and cultural backgrounds, the questionnaire was written in 'simplified Chinese'.[7] As all our interviewees were native Chinese (and not necessarily English speaking) a questionnaires written in Chinese was believed to be indispensable. Responses to questions were also written in Chinese, to ensure that nothing would be missed by interview as a consequence of language barriers.

4. Evidence

Our analysis of how to define and measure EO, and its attributes, suggested 16 variables, under six categories (viz. innovation, 4; risk-taking, 3; pro-activity, 5; competitive aggression, 2; autonomy, 2), as being fit for this task. They all comply with the advisory rules relevant to our intended statistical analysis (viz. internal consistency, factor analysis, regression analysis) as regards: sample size ($n = 83 \geq 50$); and the ratio between sample size and the number of attributes to be factor analysed (≥ 5 cases; $83/16 \geq 5$). We used Cronbach's (1951) α as a statistical measure of the internal consistency of our data set. It gauges the extent to which our set of attributes measures a single one-dimensional latent construct. In our case, the relevant latent constructs are 'entrepreneurship' or 'intangible assets'. We found that the overall Cronbach's α, based on all our standardized attributes, is 0.42, which is below the acceptable level of 0.7 (Nunnally, 1978), suggesting that entrepreneurial orientation is not unidimensional.

Operational content is given to IA using a statistical procedure. The 26 attributes, derived from our review of empirical studies give us a reassuringly high Cronbach α of 0.76. However, our factor analysis cannot use all attributes, since this would

7 Simplified Chinese is widely used in Mainland China now, while traditional Chinese is used mainly in Hong Kong, Macau and Taiwan.

breach the recommended ratio (n/m ≥5) between sample size (n) and the number of attributes (m) to be factor analysed , as n/m = 3.19. An inter-item correlation analysis was therefore undertaken, in order to filter-out the less important attributes of our universal concept, as indicated by the data of Table 2. Note that in Table 2 we have the notation that Pearson's correlation coefficient is significant at the: 0.01 level (**); 0.05 level (*); 1-tailed test.

[Insert Table 2 here]

Based on the inter-item correlations of Table 2, ten attributes were dropped. We retain the 16 the most relevant attributes, thus achieving compliance with the criteria that: (n/m) = 83/16 ≥5; and that the coefficient $\alpha = 0.703 \geq 0.70$. The KMO[8] measure of homogeneity of variables is adequate at 0.627, and Bartlett's test of sphericity (i.e. departure from orthogonality) is also significant at the 0.01 level (approx. χ^2 = 295.174; and d.f. = 120). We turn now to the exploratory factor analysis of IA. Our aim is to discover the factor structure ('theory') which best explains the correlations among our variables. Explanatory factor analysis was used to extract six factors of IA (viz. intellectual property, human capital, reputation, networks, technology, enterprise culture) by the method of principal components, with varimax and direct oblimin rotations. This explained 66% of the total variance. Although some of the IA factors extracted had relatively small α coefficients, the overall α coefficient (0.703 for 16 items) was acceptable.

With regard to the 16 variables under IA, six factors of high reliability have been extracted. They are broadly consistent with our prior knowledge of IA, largely based

[8] Kaiser-Meyer-Olkin measure of sampling adequacy

on the empirical studies we reviewed in the second Section (on IA), but with a few new characteristics. For example, the factor Intellectual property had largely been related to attributes of patents (like Npatent), but now this has been extended to: international quality standards (e.g. ISO9000) (ISO); and the establishing of an R&D unit or a technical development centre (RDbranch) within the firm. Further, our Human capital factor quite naturally embraces the attributes of: training for senior managers (Toptrain); and the use of enterprise stimulation schemes (Stimula). Less obvious is its embracing of socializing activity (Social), regarded not as a part of enterprise culture, but rather as an activity that works through human resource management to enhance the capabilities, skills and efforts of employees. Such socializing activities play an efficacious role in reducing work disputes and increasing the average period of job tenure. This is to the benefit of 'learning by doing' and related vectors of worker-driven technical change, all of which are expected to enhance the quality of human capital.

Unsurprisingly, advertisements (Ads) and a variety of channels (Adsmedia) are important attributes of the firm's Reputation (considered here as a key factor). The Network factor's attributes are the relationship with technical partners (Technet), and with suppliers (Supnet). The factor Technological Knowledge has three attributes: self-perceived technological level (Tech) compared with the industry average; the use of software (Software); and the launch of a website (Website). Finally, the attributes of the factor Enterprise Culture are a firm's openness to change (as measured by flexibility to change company codes, Codes), and business leadership (measured here in terms of entrepreneurial influence, CultureS). Although some attributes now fall into different categories, in terms of factors, compared to our preliminary

operationalization, the six principal factors we have extracted are generally robust and congruent with our previous framework.

5. Analysis

We now devise and estimate a multiple regression model of firm growth, which calibrates and shows the influence of EO and IA on firm growth, as measured by employment growth. We use the full set of attributes available to us. Estimation is by ordinary least squares, with corrections for heteroskedasticity, and for sample selection bias. First we must translate EO and IA, as abstract concepts, into empirical reality. To do so we produce an index for each concept, based on their attributes as indicated by the factor analysis. The process of indexation utilises the identity expressed by:

$$\text{Index} = \Sigma^{n}_{i} (\text{weight}_i \times \text{attribute}_i) \qquad (1)$$

In (1), attribute refers to the component factor score[9] according to the principal components method after varimax rotation; weight refers to the contribution that each factor makes to the total variance; and n = the number of factors extracted. The factor scores of the attributes of EO and IA, as well as their overall indices, are reported in Table 3.

[Insert Table 3 here]

By contrast to the ambiguous findings for the EO index, the influence of the IA index on firm growth is indeed significant at the 0.1 level, and positive. This finding is consistent with the resource-based view of the firm (e.g. Wernerfelt, 1984; Barney,

9 The factor analysis scores are saved as new variables for each factor in the final solution, using SPSS 12.0. Factor scores are produced by regression method, having mean of 0 and a variance equal to the squared multiple correlation between the estimated factor scores and the true factor values.

1991; Peteraf, 1993; Teece et al, 1997), which suggests that the more the IA held, the faster will the firm grow. Guangdong Province, as one of two most prosperous regions in China (the other one being the Shanghai region), has a large regional economy which has been fairly well developed over more than two decades. Our results on IA suggest that the firm growth in this context should now be thought to depend, not only on tangible assets, but also on intangibles, which have been described as rare, heterogeneous and difficult to create, imitate or substitute (Wiklund, 1998). This finding may help to clarify why some Chinese firms find it increasingly difficult to be successful by simply adopting the standards of OEM (Original Equipment Manufacturer)[10], whilst otherwise maintaining the status quo. We find that those who do go beyond a simplistic OEM mentality, and are willing to make efforts to build up brands and to establish a wider network, are able to expand their businesses further[11]. Finally, although the IA index as a whole positively influences firm growth, it remains important to explore the individual roles which each attribute of it have played, in stimulating growth, or otherwise. Hence, our 'comprehensive' EO-IA-Growth model is examined next.

A Comprehensive EO-IA-Growth Model

We now use the disaggregated attributes of both EO and IA, with the purpose of examining their individual effects on the growth of the Chinese small firm. In specifying the model, we focus on employment growth, thus adopting the same key metric as in the path-breaking work of Birch (1987, 1993). As it happens, this is also the key metric for policymakers. Thus, for our growth model, the dependent variable

10 These firms typically lack intangible assets (and related capabilities), and therefore find it hard to compete when competition gets fierce, and profit margins are squeezed.

11 The year 2006 was declared to be 'the year of the Chinese Brand' by the Ministry of Commerce in China.

(Ge) we use is the employment growth rate (in natural logarithms) computed from firm size data provided in two interviews during 2004 and 2006. To determine a linear relationship which uses the attributes of EO and IA to explain small firm growth, we specify size, age (in logs), and the indices of EO (EOdex) and IA (IAdex) as explanatory variables in a linear regression equation. To this is added a sample selection (i.e. 'survival') variable IMR (i.e. the 'inverse Mill's ratio') for bias correction. The IMR is obtained from a binary probit model of survival, $S = X\beta + u$[12]. Here, S is a binary variable ('survival') which is equal to unity if the firm has survived until the second-stage interview and zero otherwise. X is a matrix containing the variables thought to affect the survival of Chinese private firms in the sample (viz. preceding growth rate, gearing, cash flow problems, customer orientation, size in terms of sales and of employment, and sector). White's heteroskedastic robust standard errors are used. On this basis, a comprehensive model of how employment growth is determined by EO and IA is generated as follows:

$$Ge = \beta_0 + \beta_1 Size + \beta_2 Age + \varphi^T EOvec + \gamma^T IAvec + \beta_3 IMR + \nu \qquad (3)$$

where Size is measured by the number of full time employees in 2004, Age is number of years from inception to 2004, EOvec is a vector of EO attributes with coefficients vector φ, IAvec is a vector of IA attributes with vector of coefficients γ. The superscript T denotes vector transposition. IMR (the inverse Mills ratio) is the sample selection (i.e.'survival') bias variable and ν is the error term. Estimation is by OLS using White's (1980) heteroskedastic consistent standard errors. The estimates are reported in Table 4.

[12] The IMR is computed as $\varphi(X\beta)/\Phi(X\beta)$ for S = 1, and the same expression minus unity for S =0, where φ is the normal pdf and Φ is the normal cdf.

[Insert Table 4 here]

Considered overall, our model of Table 4 is highly satisfactory. The R^2 is high for models of this sort (0.064) and even adjusted for degrees of freedom is high (0.41) for cross section models. The F-statistic for overall fit (2.76) is highly statistically significant (prob. value = 0.02). The IMR is also highly statistically significant (prob. value = 0.002) and works to correct for sample selection ('survival') bias, due to exiting of firms. Here we find that Gibrat's Law is strongly rejected (e.g. given the highly significant negative coefficient on Size), and Jovanovic's entrepreneurial learning-by-doing theory has some support (the coefficient on Age is negative and significant at the level of 0.1), Some of the learning effect normally captured by the Jovanovic Age variable is picked up by the several IA attributes. This begins to present our comprehensive model as a viable alternative to both Gibrat (1931) and Jovanovic (1982). To put it alternatively, in our work, Gibrat is generalised; and Jovanovic is extended.

With regard to proactiveness II, which is defined in terms of defensive strategy and strategic planning, the passivity of the former and the dubious effectiveness of the latter, may actually cast a long shadow on growth. For new small firms, one of the successful tactics is to attack, rather than to defend, (Reid et al., 1993), unless such defensive strategies as have been adopted are well designed to have a combative or aggressive posture. Even this may possibly enhance the performance (e.g. profitability), yet may not necessarily achieve growth (Lumpkin and Dess, 1997). Finally, proactivity in strategic planning (which is very time- and materials-intensive) may itself absorb capabilities and resources that could have been better used for growth. This could impede expansion in the short term, even if it were helpful in the long run.

Based on the literature, on balance we generally expect a positive impact of EO on firm performance (Zahra, 1991; Zahra and Covin, 1995; Wiklund, 1998, 2004; Rauch, et al. 2004), with a few authors suggesting a negative impact of EO, in certain circumstances (e.g. Hart, 1992). However, our estimates suggest no significant impact of EO on firm growth at all, at least so far as the index of EO goes. To some extent, this is consistent with the views of Smart & Conant (1994) and Auger, et al. (2003), who have suggested there is no plausible, stable and consistent relationship between EO and firm outcomes.

The reasons for this are manifold. First, analytically – if not to judge just by modern business parlance - performance is much wider concept than growth (cf. O'Connor & Feng, 2005). Arguably, it is too simple to treat firm growth as the key variable for evaluating performance. Although entrepreneurship may enhance overall performance, as some have argued, it seems unnecessary that a similar effect should be observed in terms of employment growth. One might think that small firms with higher EO within their limits have it because of their entrepreneurial talents. Yet those with this type of human capital in abundance are extremely hard to retain. They may readily take the chance of setting up their own businesses (e.g. with some former colleagues, or new followers) when a good market opportunity emerges. Therefore, the impact of high EO may be more to encourage an increase in the number of new SMEs, rather than to increase the employment within existing SMEs. This may help to explain why Guangdong Province (where the primary source data used in our paper were collected), is the archetypical region in China for abundance of clusters of SMEs. Examples of such SME clusters include Dong Guan (the centre of electronics companies), Jie Yang (the centre of plastic goods manufacturers), and Fo Shan (the centre of sanitary ware factories).

In terms of the EO-Growth relationship, the coefficients of adventurousness and proactiveness I are highly insignificant. However, innovativeness and proactiveness II are related to employment growth rate in a negative way, but the prob. values (0.19 and 0.16, respectively) would not normally denote significance.[13] It may be that these Chinese firms compete on a different basis to innovation, and if so, they might prefer alternatives (e.g. imitation or emulation). Indeed, Nelson and Winter (1982) have argued that sometimes imitation can be more effective than innovation for the enhancement of a firm's performance; compare this to Jarrar & Smith (2014) who look at the role of innovation in developing entrepreneurial strategies, or Lev (2001) on the importance of innovation in creating intangibles. Guangdong Province has more of a reputation for being the 'world's factory' rather than for being its 'silicon valley'. Indeed, many firms in this region are said to excel by imitation. Our results suggest that heavier R&D emphasis, larger R&D expenditure, higher R&D intensity, and perhaps even greater use of E-commerce, may eventually lead to a lower headcount, as weighty R&D budgets are in a trade-off relationship against the wage bill.

Our finding is that the disaggregated attributes of EO in equation (3) (see Table 4) do not appear to influence small firm growth significantly. This may be because of aggregation across EO attributes, some of which have positive effects, while the rest have negative effects, on growth (i.e. a positive sign for adventurousness and a negative sign for the rest). While it remains equivocal whether the willingness of entrepreneurs can be transformed effectively and successfully into growth of the small firm, the evidence on intangible assets, our other growth determinant, is more affirmative.

13 Considering the sample size in this study, these results may at least be indicative, even if they are not statistically significant.

Referring to Table 4, three attributes of IA (i.e. network, technological knowledge, enterprise culture) have a significant positive relationship with growth, and the other two attributes of IA (i.e. intellectual property, human capital) seem to exert at least some influence. However, reputation appears not to be statistically significant at any reasonable prob. level. It comes as no surprise that network is important for the growth of firms, as 'guan xi' speaks louder than anything else in Chinese business (Butler and Brown, 1994; Ding et al, 2015; Rickne, 2001). For a modernising developing country like China, this pervasive culture of 'guan xi' is so very powerful that, on many occasions, firms are vying for opportunities brought about by 'guan xi' (mainly with suppliers and buyers), rather than by professionalism or market-based competition (cf. Lu, 2012). Besides, successful high-growth firms also seem to arise from the use of advanced technological knowledge, typified by the entrepreneur's technological skill, his use of software and his running of the firm's website. As Drucker (1988) has argued, this sort of knowledge can be the main driving force behind lowering cost and enhancing management skills, thus leading to better firm outcomes. Further, although Eggers, et al.(1996) and Merrifield (2005) have asserted that an outmoded conception of the enterprise culture can actually check a firm's expansion, the modern healthy enterprise culture of Guangdong actually seems to boost growth. This resembles the findings of Nahm, et al.(2004) and Irani, et al.(2004). Their results suggest that the more flexible is the firm (e.g. in adapting its company regulations or codes to its environment) and the greater the influence that the owner-manager/entrepreneur has, the more likely is the firm to grow.

Another attribute of IA, intellectual property, also has a positive relation to growth, albeit slightly weak (prob. = 0.1786). This may be largely because of the widespread lack of observance of intellectual property rights in China, extending to a

cavalier attitude towards patents, copyrights and trademarks. Given this unfavourable setting for IP protection, the potential of intellectual property for creating market power (e.g. by right of monopoly provision or exclusive production) cannot be transformed readily into 'competitive advantage' (Hall, 1992) resulting in an unpromising growth outlook. Human capital appears to have a positive influence on firm growth as well, yet it is not statistically significant. Training for top management, socializing activities, and enterprise stimulation schemes, whilst of potential significance, seem to have no impact on firm growth in our modelling. It may be that human capital would be more significantly related to growth were it defined in terms of founders' educational background, and relevant prior work experience, as in the study of Colombo and Grilli (2005). Reputation, surprisingly, is insignificant (at least in the strongest sense), which is in conflict with the findings of Roberts and Dowling (2002) and Galbreath (2005). Due to inevitable limitations of the data collected, the variable Reputation is defined in limited terms, by the number of advertisements, and the type of advertisement channels, neither of which really capture the idea of reputation as an intangible asset, related, for example, to goodwill: a quality which is intrinsically linked to the customer base of the business. Judged in this light, it is understandable that this IA attribute seems not to affect the growth outcome. It may be that the relationship between reputation and growth is positive and robust for different concepts of reputation (e.g. customer services, product services).

6. Conclusion

This paper is rooted in the so-called 'managerial' theories of the firm. Technically our research tasks were to: (a) use new fieldwork evidence to turn two abstract concepts, namely entrepreneurial orientation (EO) and intangible assets (IA), into operational

measures; and (b) use our new measures in an econometric model of small firm growth. We believe our work to be novel in a number of respects. First, despite the well-known secrecy which is so characteristic of the Chinese business culture, we were able to obtain accurate first-hand firm-level evidence. This was made available through trusted 'gatekeepers' to the field, and involved interviewing Chinese entrepreneurs face-to-face. Second, predicated on these in-depth data, appropriate statistical techniques were utilized to make the abstract concepts of EO and IA operational for the first time. Our new measures were incorporated into a new specification of econometric growth model for the small firm.

The principal findings of this paper are therefore as follows. First, while EO and IA are defined as two abstract constructs at a higher level, they are capable of empirical implementation. Second, both EO and IA can be used to generalise and extend existing models of small firm growth. EO is found to be insignificant in its impact on growth, whilst IA was found to be a highly significant and positive in its impact on growth. Our paper suggests that, so far as our empirical evidence goes, little can be attributed to entrepreneurship, in terms of performance and growth, but rather that intangible assets are of key importance.

We have achieved our aim of measuring two complex and multidimensional concepts, entrepreneurship and intangible assets, and using these in econometric models of firm performance. Further, we have applied our model to empirical data in order to examine their influence over the growth of Chinese SMEs (cf. Jarrar & Smith, 2014; Rhodes et al, 2011; Schiff, 2013). A perhaps surprising result is that, contrary to the expectation that entrepreneurial skills would lead to enhanced business performance (cf. Bisbe & Malgueño, 2015; Chenhall et al, 2011), in fact, entrepreneurship is shown to have little to no positive impact, though this is consistent

with the findings of some previous authors (e.g. Smart & Conant, 1994; Auger et al., 2003).

On the other hand, the existence of intangible assets is shown to have a positive and significant impact upon performance, supporting earlier findings along these lines (e.g. Basu & Waymire, 2008). The policy in China, therefore, or encouraging the nation to acquire, realize and exploit their 'intangibles', appears to have been successful (cf. Wan et al, 2015). Specifically, the entrepreneur's network, technological knowledge and the enterprise culture are all positively and significantly associated with better performance. Further, there is a suggestion that the quality of intellectual property has some positive impact. An ability to build upon and exploit these intangibles can therefore help the owner-manager of a small entrepreneurial firm in China to achieve growth and enhanced performance.

APPENDIX

Definition of Variables Used in Main Text (in alphabetic order)

Ads	=1 if making advertisements, 0 otherwise
Adsmedia	The number of media types used for advertisements
Advinet	The major sources for advices at inception: small (1), medium (2), large (3)
Age	Number of years from inception to 2004
CEO	=1 if CEO and the board director is the same person, 0 otherwise
Codes	The flexibility of changing company codes: low (1), medium (2), high (3)
Communi	The number of communication methods
CultureS	=1 if enterprise culture is significantly influenced by entrepreneurs, 0 otherwise
Defestgy	The number of defensive strategies taken
Delegate	The level of control: (1) low, (2) medium, (3) strong
Diploma	The degree of higher education among employees: very low (1), low (2), medium (3), high (4), very high (5)
Ebiz	The willingness to do E-commerce: low (1), medium (2), high (3)
ExInvest	=1 if a firm has extra investment after the inception, 0 otherwise
Ge	Annual growth rate of employment between 2004 and 2006
IMR	The inverse Mill's ratio
Investage	The number of extra investment per year after the inception
ISO	The willingness to adopt international quality standard: low (1), medium (2), high (3)
Knet	The base of financial sources: very small (1), small (2), medium (3), large (4)
Mmkt	The Market extent: local (1), provincial (2), national (3), Asian (4), International (5)
MSurvey	=1 if a firm conducts the market survey, 0 otherwise
NewPro	The innovation of new products: very low (1), low (2), medium (3), high (4), very high (5)
Npatent	The number of patents held valid in a firm
NStimula	The number of stimulation schemes
Patent	=1 if a firm has any patent, 0 otherwise
Psurvey	The number of survey purposes
RDbranch	The establishment of R&D department: none (1), informal (2), formal (3)
RDexpend	The amount of money spent on R&D activities in 2004: very small (1), somehow below medium (2), medium (3), somehow above medium (4), very large (5)
RDorien	The degree of R&D orientation: low (1), medium (2), strong (3)
RDprofit	The ratio of R&D expenditure to profit: very low (1), somehow below medium (2), medium (3), somehow above medium (4), very high (5)
Reputation	The reputation compared to substitutes: below average (1), average (2), good (3)
Gearing	The degree of risk-taking: very low (1), low (2), medium (3), high (4), very high (5)

Salary	The salary level compared to the industry average: relatively low (1), somehow below average (2), average (3), somehow above average (4), relatively high (5)
Size	Number of full-time employees in 2004
Slogan	=1 if a firm has a company slogan, 0 otherwise
Social	The frequency of company socializing activities: very low (1), low (2), medium (3), high (4)
Software	The number of software that a firm employs
StgyPlan	=1 if a firm makes strategic development plans, 0 otherwise
StockEx	The ambition of being listed in the SME board of stock exchange: low (1), medium (2), strong (3)
Substi	=1 if superior to the substitutes, 0 otherwise
Suppnet	The base of suppliers: very small (1), small (2), medium (3), large (4), very large (5)
Survival	=1 survivor in 2006, 0 otherwise
Tech	The technological level: low (1), less advanced (2), moderate (3), moderately advanced (4), highly advanced (5)
Technet	The base of technological support: very small (1), small (2), medium (3), large (4), very large (5)
Toptrain	The frequency of top management training: very low (1), low (2), medium (3), high (4)
Training	=1 if a firm has training programs, 0 otherwise
Website	The willingness of having its own official website: low (1), medium (2), high (3), very high (4)
Workcon	The standard of working condition: poor (1), below average (2), average (3), above average (4), good (5)

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Table 1: Size Distribution by Employment of Firms in Sample and in Guangdong Province

	Sampled Firms	Guangdong Firms
Small	77	15409
	(92.8%)	(88.1%)
Medium	5	1285
	(6.0%)	(7.3%)
Large	1	794
	(1.2%)	(4.5%)
Total	83	17488
	(100%)	(100%)

Note to Table 1: Source for column 2 – The National Bureau of Statistics (NBS) China, 2005

Table 2: Inter-item Correlations of Preliminary IA attributes

	Substi	Ads	Ads-media	Knet	Tech-net	Sup-net	Advi-Net	Ebiz	Com-muni	Npatent	Website	Iso	Soft-ware	Codes	Slogan	Social	Work-con	CultureS	Dip-loma	Salary	Train-ing	Stimula	Top-train	Patent	RD-branch
Substi	1																								
Ads	0.01	1																							
Adsmedia	0.133	.639**	1																						
Knet	-0.091	0.093	0.154	1																					
Technet	0.015	-0.041	0.012	-0.097	1																				
Supnet	0.009	0.004	0.005	-0.033	.344**	1																			
Advinet	0.055	0.104	0.144	0.032	0.097	-0.094	1																		
Ebiz	0.119	.261**	0.103	0.079	0.032	0.176	-0.056	1																	
Communi	-0.051	.291**	.182*	-0.153	0.09	0.125	-0.092	.364**	1																
Npatent	.462**	-0.004	0.058	-0.033	0.001	0.061	-0.124	.280**	0.02	1															
Website	0.042	.294**	.444**	0.128	0.118	0.095	-0.145	.421**	0.163	.269**	1														
Iso	0.175	0.146	.216*	-0.014	.238*	0.182	0.074	.484**	.374**	.344**	.333**	1													
Software	0.15	0.07	0.147	-0.055	0.102	0.101	-0.053	.207*	0.127	-0.022	.394**	0.175	1												
Codes	-0.012	0.033	0.082	0.039	-0.041	-.194*	-0.078	0.008	0.01	0.077	0.109	0.142	0.003	1											
Slogan	0.003	0.061	0.129	0.162	.222*	0.092	0.018	0.071	0.081	0.109	.236*	0.165	0.069	-0.137	1										
Social	0.032	.213*	.226*	0.177	-0.073	.283**	-0.075	0.154	0.163	0.07	.408**	0.079	.309**	.241*	.191*	1									
Workcon	0.172	-0.07	-0.022	0.17	0.079	0.069	-0.147	0.174	0.018	0.155	.214*	0.159	.265**	-0.027	0.017	.229*	1								
CultureS	-0.165	-0.082	-0.127	.293**	-0.184	-0.056	-0.043	0.045	-0.008	0.007	-0.018	-0.043	-0.096	.359**	0.053	0.03	-0.056	1							
Diploma	0.118	.237*	.244*	-0.18	-0.088	-0.056	.276**	0.12	0.143	-0.087	.197*	0.07	.314**	-0.053	0.034	.231*	0.035	-0.163	1						
Salary	-0.026	-0.063	-0.056	-.192*	0	0.075	0.132	0.102	0.039	.220*	-0.012	.186*	0.156	0.034	0.102	0.076	0.014	-0.026	.203*	1					
Training	0.112	.241*	0.1	0.024	0.123	0.055	0.071	.305**	.213*	0.088	.280**	.283**	.201*	-0.04	.274**	.220*	0.146	0.175	0.057	0	1				
Stimula	0.095	0.097	0.155	0.06	0.168	.266**	0.015	.272**	.317**	.195*	.198*	.239*	.199*	0.17	0.056	.278**	0.162	-0.001	.186*	.217*	0.102	1			
Toptrain	-0.018	.214*	0.138	.230*	0.043	0.181	-0.05	.189*	.200*	0.072	.241*	0.051	.246*	-0.018	.319**	.441**	.194*	-0.042	0.087	0.053	0.14	.343**	1		
Patent	0.073	0.053	0.036	-0.002	0.026	-0.01	-0.003	.335**	0.117	.528**	.293**	.427**	-0.082	0.03	.270**	-0.024	0.022	0.03	0.011	.244*	0.014	0.048	0.092	1	
RD-branch	.286**	-0.011	0.109	-0.007	.268**	.277**	-0.079	.233*	0.107	.299**	.303**	.479**	.251*	.196*	.247*	0.173	.345**	-0.016	0.067	0.12	.222*	.232*	.251*	.390**	1

Note to Table 2 - Pearson's correlation coefficient, significant at the: 0.01 level (**); 0.05 level (*); 1-tailed test.

Table 3: Statistics of EO and IA Attributes and Indices

	Min.	Max.	Mean	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
EO								
Adventurousness	-2.284	2.579	0.019	0.997	-0.123	0.267	0.108	0.529
Innovativeness	-1.590	2.203	-0.008	0.981	0.531	0.267	-0.593	0.529
Proactiveness I	-2.881	1.254	0.006	1.002	-1.671	0.267	2.122	0.529
Proactiveness II	-1.879	3.222	-0.008	1.011	0.350	0.267	0.383	0.529
EOdex	-0.913	0.641	0.003	0.336	-0.388	0.267	-0.168	0.529
IA								
Intellectual Property	-1.188	4.141	-0.022	0.999	1.604	0.281	3.012	0.555
Human Capital	-2.420	1.514	0.024	0.982	-0.699	0.281	-0.165	0.555
Reputation	-1.781	1.761	-0.034	1.020	-0.232	0.281	-1.137	0.555
Network	-2.204	2.753	-0.061	0.982	0.402	0.281	0.115	0.555
Technological Knowledge	-1.938	2.097	0.000	0.967	-0.018	0.281	-0.587	0.555
Enterprise Culture	-3.099	0.990	-0.048	1.023	-1.500	0.281	1.509	0.555
IAdex	-0.722	0.809	-0.014	0.294	0.018	0.281	0.410	0.555

Table 4: The Comprehensive Entrepreneurship-IA-Growth Model (n = 66)

Variable	Coefficient	Std. Error	t-Statistic	Prob.Value
C	0.509309	0.134192	3.795369	0.0011***
Log(Size)	-0.103250	0.035170	-2.935784	0.0082***
Log(Age)	-0.093811	0.053437	-1.755542	0.0945*
Entreprenurship				
Adventurousness	0.016765	0.042967	0.390182	0.7005
Innovativeness	-0.060585	0.044927	-1.348513	0.1926
Proactiveness I	-0.037086	0.063192	-0.586877	0.5639
Proactiveness II	-0.057162	0.039361	-1.452254	0.1619
IA				
Intellectual Property	0.071864	0.051546	1.394171	0.1786
Human Capital	0.053340	0.049912	1.068695	0.2979
Network	0.124765	0.063221	1.973487	0.0624*
Reputation	-0.004762	0.051152	-0.093095	0.9268
Technological Knowledge	0.098752	0.044643	2.212063	0.0388**
Enterprise Culture	0.084543	0.035000	2.415510	0.0254**
IMR	-0.014194	0.005701	-2.489942	0.0217**
R-squared	0.641739	F-statistic		2.755781
Adjusted R-squared	0.408869	Prob(F-statistic)		0.020329**

Note: Significance at Levels: 1%(***), 5%(**), 10%(*).